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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/580,953

03/02/2007

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Q95153

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23373 7590 08/05/2011  
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EXAMINER

TADAYYON ESLAMI, TABASSOM

ART UNIT

PAPER NUMBER

1712

NOTIFICATION DATE

DELIVERY MODE

08/05/2011

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/580,953	<b>Applicant(s)</b> KANO ET AL.	
	<b>Examiner</b> TABASSOM TADAYYON ESLAMI	<b>Art Unit</b> 1712	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 27 April 2011.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-12, 20-23 and 26-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12, 20-23, 26-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Objections*

1. Claims 3-4 are objected to because of the following informalities: In line 4, the claim states; forming a substrate a polymer layer, which is not clear if the substrate and the polymer layer are both made by the method or it requires forming a polymer layer on a substrate. The examiner believes that the claim has to be written as; forming on a substrate a polymer layer. Appropriate correction is required.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. ***Claims 1-6, 10, 20-22,26-27, 28, and 30 are rejected under 35 U.S.C. 102(b) as being anticipated by O. Touto, (Japanese Patent publication: 2001-192844, here after Touto).***

Claim 1 is rejected. Touto teaches a method of making a metal pattern (printed circuit board [abstract lines 1-3] comprising steps of;

(I) forming on a substrate a polymer layer (photosensitive resin composition) in a pattern form by using a compound of a photosensitive resin inherently has a functional group(a polymer of polyether sulphone and diaryl terephthalate have ether, thio and aryl functional groups) all in which are capable of interacting with the palladium catalyst as Touto teaches the surface of the insulating resin layer activated when the catalyst layer

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was given to it [0070(7)]; (II) adding the catalyst layer to the polymer layer(palladium catalyst) and (III) forming a metal later in the pattern form by electroless plating[0070 lines 29-end].

Claim 2 is rejected. Touto teaches the limitation of claim 1. Touto teaches forming a polymer layer (resin composition) that comprising a thermosetting resin, thermoplastic resin, hardening agent to a substrate [0070, lines 29-40]. Touto teaches forming a polymerization initiating layer(adhesive layer) in which a polymer having, on a side chain thereof, a crosslinking group(hardening agent) and a functional group having polymerization initiating (sanitization group or photo initiator)capability is immobilized by a crosslinking reaction on a base material(hardening, or stiffing)and also teaches forming a multilayer of this structure[0017, 0023, 3<sup>rd</sup> paragraph, 0025, 0071 drawing 7], so one polymer layer considered as polymerization initiating layer and another layer considered as the patterned layer .Touto teaches the catalytic layer activated the polymer layer(adhesive layer) [0070(7)], which means it inherently interacts(chemically bonded) with polymer layer(adhesive or polymerization initiating layer).

Claim 3 is rejected for the same reason claim 1 is rejected. Touto teaches step (I) further comprises: a step (I-1-1) of forming on the substrate a polymer layer by chemically bonding a polymer which has a functional group whose structure is inherently changed to a structure that interacts with the catalyst precursor and step (1-1-2) of curing the polymer layer due to application heat, acid, or radiation [0009(2), 0072], prior to application of catalyst layer.

Claim 4 is rejected. Touto teaches forming a polymer layer that comprising, on a side chain (PES) having crosslinking group (hardening agent), [0070(lines 29-41)]. Touto teaches forming a polymerization initiating layer in which a polymer having, on a side chain thereof, a crosslinking group and a functional group having polymerization initiating (sanitization group or photo initiator) capability is immobilized by a crosslinking reaction on a base material(hardening, or stiffing)[0017, 0023, 3<sup>rd</sup> paragraph, 0025].

Claim 5 is rejected. Touto teaches a step (I-2) of contacting a compound having a polymerizable group and a functional group that interacts with the electroless plating catalyst or precursor thereof with the substrate (adhesive layer as discussed in claim 1 and 2 rejections), irradiating the substrate with radiation in the pattern form (to cure the photoresist film laminated on the top of the resin[0070(4)]), chemically bonding the compound directly to the substrate, and thus forming, in the pattern form, a polymer layer that interacts with the electroless plating catalyst or precursor thereof(see claim 1 rejection).

Claim 6 is rejected. Since Touto teaches repeating the steps of 1-7 of the process to form a multilayered circuit pattern structure, therefore the first resin layer considered as a substrate and the second layer is a polymer having the side chain, crosslinking and functional groups(also see claims 1 and 2 rejections)[0070(8), fig. 5].

Claims 10 and 28 are rejected. Touto teaches the limitation of claims 1 and 3 and Touto teaches performing electroplating after step III (electroless plating) [053 lines 8-11, 0070(8)].

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Claim 20 is rejected. Touto teaches a method of forming a conductive film (printed circuit), comprising the steps of: (A) producing a substrate having a polymerization initiating layer (adhesive layer) in which a polymer having, on a side chain thereof, a crosslinking group and a functional group having polymerization initiating capability is immobilized by a crosslinking reaction (hardening or stiffing) on a base material(hardening agent); (B) generating a graft polymer(crosslinked) by chemically bonding a polymer having a functional group that interacts with catalyst or a precursor thereof (a polymer of polyether sulphone and diaryl terephthalate have ether, thio and aryl functional groups) all in which are capable of interacting with the palladium catalyst as Touto teaches the surface of the insulating resin layer activated when the catalyst layer was given to it directly onto the entire surface of the polymerization initiating layer [0070(7)]; (C) adding the catalyst or precursor thereof to the graft polymer(palladium); and (D) forming a metal layer by electroless plating[0070].

Claim 21 is rejected. Touto teaches step (B) further comprises: a step (B-1) of generating an active site on the polymerization initiating layer by applying energy(heat) to the surface of the particular polymerization initiating layer after contacting a compound having a polymerizable group and a functional group that interacts with the electroless plating catalyst or precursor thereof with the polymerization initiating layer; and then generating, with the active site as a base point, a graft polymer(crosslinked) having a functional group that interacts with the electroless plating catalyst or precursor thereof and chemically bonding directly to the surface of the polymerization initiation layer[0021,0023, 0045, 0070, also see claim 20 rejection].

Claim 22 is rejected. Touto teach the limitation of claim 20 and Touto teaches performing electroplating after step III (electroless plating) [0070(8)].

Claims 26-27 and 30 are rejected. Touto teaches the functional group can be carboxyl group (dimethylaminoethyl benzoic acid (amino acid) [0038 line 16].

**4. Claims 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over O. Touto, (Japanese Patent publication: 2001-192844, here after Touto), further in G. G. Barclay(U. S. Patent Application: 2003/0235785, here after Barclay).**

Claim 7 is rejected. Touto teaches the metal pattern forming method according to claim 1, wherein the step (I) further comprises: a step (I-3-1) of forming on a base material (glass epoxy copper clad) a photosensitive layer (photoresist layer, or photomask layer, novolak type epoxy resin) containing a light to heat conversion substance (for example polyether sulphone) and a binder (butyl cellosolve) and forming a polymer layer by chemically bonding a polymer having a functional group that interacts with an electroless plating catalyst or a precursor thereof directly onto the entire surface of the photosensitive layer( the adhesive layer (see claim 1 rejection above); and a step (I-3-2) of forming, in the pattern form, a polymer layer that interacts with the electroless plating catalyst or precursor thereof by irradiating the polymer layer with radiation in the pattern form and ablating(removing or dissolving the resist due to developing the resist) the photosensitive layer[0070(2-5)]. Touto does not teach the light to heat substance comprising a dye. Barclay teaches a photoresist useful for short wavelength imaging [title] comprising novolak resin and UV absorbing dye [0081], which can be used for plating purposes [0089]. Therefore it would have been obvious to one of

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ordinary skill in the art at the time of invention was made to have a method of making a metal pattern as Touto teaches, where the resin component comprising a UV absorbent dye as Barclay teaches, because Barclay teaches it is suitable to have a UV dye in novolak resin component, it also helps to absorb the UV light, so the resin exposure happens is more effectively.

Claim 8 is rejected. Touto the photosensitive layer in the step (I-3-1) is a polymerization initiating layer in which a polymer having, on a side chain thereof, a crosslinking group(hardening agent) and a functional group having polymerization initiating capability is immobilized on the base material by a crosslinking(hardening) reaction[0070(2), 3<sup>rd</sup> paragraph].

**5. Claims 1, 20, 9, 11, 12, 23, 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yasuhiro Wakizawa et al (Japanese Patent Publication: 2003-332738, here after Wakizawa, further in view of O. Touto, (Japanese Patent publication: 2001-192844, here after Touto).**

Claim 1 is rejected. Wakizawa teaches a method of forming a metal (wiring) pattern [0001], comprising the steps of: (I) forming on a substrate (insulating layer, 15) [0055], and (II) adding the electroless plating catalyst or precursor thereof to the substrate (20) [0056, 0068]; and (III) forming a metal layer in the pattern form by electroless plating (22) [0069, 0072]. Wakizawa also teaches to increase the adhesion is to add an adhesion layer for electroless plating such as resin [0004, 0014]. Wakizawa does not teach forming a polymer layer or an adhesive layer on the substrate (15).

Touto teaches a method of making a metal pattern (printed circuit cord) [abstract lines



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1-3] comprising steps of; forming a polymer layer (resin composition) in which a polymer having functional group that inherently interact with catalyst layer (activated the surface of adhesive layer)[0070], a polymer of polyether sulphone and diaryl terephthalate have ether, thio and aryl functional groups) all in which are capable of interacting with the palladium catalyst as Touto teaches the surface of the insulating resin layer activated when the catalyst layer was given to it directly onto the entire surface of the polymerization initiating layer [0070(7)], thereof is chemically bonded directly to the substrate in a pattern;(II) adding the catalyst layer to the polymer layer[0070 (7)], which acts as adhesive[0071, lines 1-3] and (III) forming a metal later in the pattern form by electroless plating[0070]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of making a metal pattern as Wakizawa teaches, where the resin layer is inserted between the substrate<sup>15</sup> and the metal layer as Touto teaches, because Touto teaches a suitable composition for increasing the adhesion between a substrate and a plating layer.

Claim 9 is rejected. Wakizawa teaches step of carrying out drying after the plating step (III) [0043] which obviously helps the fluid leaves the final product.

Claim 11 is rejected. Wakizawa teaches a step of carrying out drying after the step (IV) [see claim 9 rejection above].

Claim 31 is rejected for the same reason claims 9 and 11 are rejected.

Claim 20 is rejected. Wakizawa teaches a method of forming a metal (wiring) pattern [0001], comprising the steps of: (A) producing a substrate(11+15) having a polymerization initiating layer in which a polymer having a side chain, a

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crosslinking(grafting) group and a functional group having initiating capability is immobilized by a crosslinking reaction on a base material[0037-0038] adding the electroless plating catalyst or precursor thereof to the substrate (20) [0064, 0066]; and (III) forming a metal layer in the pattern form by electroless plating (22) [0073].

Wakizawa also teaches to increase the adhesion is to add an adhesion layer for electroless plating that contains polymer such as resin [0004, 0014]. Wakizawa does not teach forming a polymer layer or an adhesive layer on the substrate (15). Touto teaches a method of forming a conductive film (printed circuit), comprising the steps of forming an adhesion composition by: (B) generating a graft polymer(crosslinked) by chemically bonding a polymer having a functional group that interacts with catalyst or a precursor thereof directly onto the entire surface of the polymerization initiating layer; (C) adding the catalyst or precursor thereof to the graft polymer; and (D) forming a metal layer by electroless plating[0059]. Therefore it would have been obvious to one of ordinary skill in the art at the time of invention was made to have a method of making a conductive film as Wakizawa teaches, where an adhesive layer is inserted between the substrate<sup>12</sup> and the metal layer as Touto teaches, because Touto teaches a suitable composition for increasing the adhesion between a substrate and a plating layer.

Claims 12, 23, and 29 are rejected. Wakizawa teaches the substrate (insulating film, 15) is a substrate having a surface roughness of 500 nm or less [fig. 4, 0171, and 0172].

***Response to Arguments***

6. The examiner acknowledges the foreign priority documents received on May 30, 2006. The drawing received on May 30, 2006 has been accepted.

7. Applicant's arguments see Remarks, filed 04/27/2011, with respect to 35 USC112 second paragraph rejections have been fully considered and are persuasive. The 35 USC 112 second paragraph rejections of claims 7-8 has been withdrawn.

8. Applicant's arguments filed 05/17/11 have been fully considered but they are not persuasive. The applicant argues Touto does not teach the specific compound have both a polymerization group and a specific functional group as polyether sulphone and diaryl terelathalate do not react with each other, however the claim requires interaction between the catalyst and polymerizable group and functional group not between the polymerization group and the functional group together.

9. The applicant further argues for claim 3, the specific group contained in the polymer is structurally changed by heat or radiation or acid, while Touto does not teach it. The examiner disagrees, Touto teaches curing the polymer layer due to application heat, acid, or radiation (see claim rejection above).

10. The applicant argues in claims 2, 4, and 6 Touto does not teach a specific polymerization initiating layer is formed as an independent layer prior to forming a polymer layer, however based on Drawing 7 of Touto and paragraph 0071, as there is a multilayer patterned polymer structure, first polymer layer can be considered as polymerization initiating layer and next patterned polymer layer considered as the polymer layer on it.

***Conclusion***

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to TABASSOM TADAYYON ESLAMI whose telephone number is (571)270-1885. The examiner can normally be reached on 7:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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